

Nikon

Microscope
ECLIPSE E600
Instructions

Thank you for purchasing the Nikon products.



This instruction manual is written for the users of the Nikon Microscope ECLIPSE E600.

To ensure correct usage, read this manual carefully before operating the instrument.

- It is prohibited to reproduce or transmit this manual in part or whole without Nikon's expressed permission.
- The contents of this manual are subject to change without notice.
- Although every effort has been made to ensure the accuracy of this manual, if you note any points that are unclear or incorrect, contact your nearest Nikon representative.

Warning/Caution Symbols Used in This Manual

Although Nikon products are designed to provide you with the utmost safety during use, incorrect usage or disregard of the instructions can cause personal injury or property damage. For your safety, read the instruction manual carefully and thoroughly before using the instrument. Do not discard this manual but keep it near the product for easy reference. In this manual, safety instructions are indicated with the symbols shown below. Be sure to follow the instructions indicated with these symbols to ensure correct and safe operation.

Symbol	Meaning
 WARNING	Disregarding instructions marked with this symbol may lead to death or serious injury.
 CAUTION	Disregarding instructions marked with this symbol may lead to injury or property damage.



WARNING

1. Intended product use

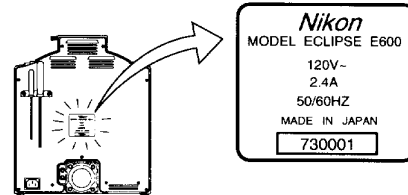
This microscope should only be used for microscopic observation. Do not use it for any other purpose.

2. Do not disassemble

Disassembling may cause malfunction and/or electrical shock. Do not disassemble any parts other than those mentioned in this manual. If you notice any malfunction, notify your nearest Nikon representative.

3. Input voltage

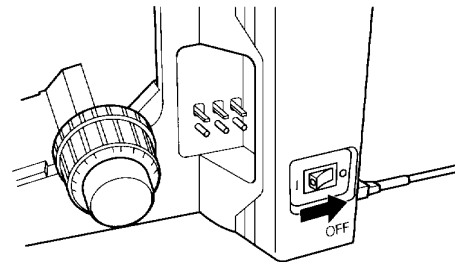
Make sure that the input voltage indicated on the back panel of the microscope is the same as your regional voltage. If not the same, do not use the microscope; instead, notify your nearest Nikon representative immediately. If the microscope is used with the wrong input voltage, a short circuit or fire may result, causing the damage of the microscope.



4. Power cord

To prevent electrical shock, always turn off the power switch (flip it to the "O" side) before connecting or disconnecting the power cord. Use only the following power supply cord set. Using the wrong power cord could result in damage or fire.

- For 100–120V area
UL Listed, detachable cord set, 3 conductor grounding type SVT, No. 18 AWG rated at 125V, 7A minimum.
In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.
- For 220–240V area
3 pole power supply cord set, which must be approved according to EU/EN standards.
Class I equipment should be connected to PE (protective earth) terminal.
In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.

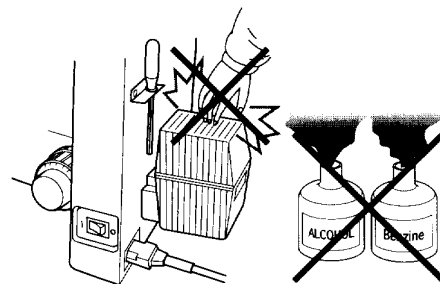


5. Heat from the light source

The lamp and the lamphouse become extremely hot. To avoid burns, do not touch the lamphouse while the lamp is lit or for thirty minutes after it has been turned off.

Furthermore, in order to avoid the risk of fire, do not place fabric, paper or highly flammable materials such as gasoline, petroleum benzine, paint thinner or alcohol near the lamphouse while it is lit or for about thirty minutes after it has been turned off.

The back of the microscope also becomes hot during use. Although this is not a malfunction, be careful not to touch the back of the microscope when it is hot.





CAUTION

1. Only use the specified halogen lamp

The power supply unit in the microscope provides the power for the halogen lamp that serves as the microscope light source. This unit can supply power for a halogen lamp of up to 12 V-100 W. The specified lamp and lamphouse must be used, otherwise, the microscope could be damaged.

Specified lamphouse: Nikon C-LP HALOGEN 12V100W model

Specified lamp: 12V-100W LONGLIFE halogen lamp (OSRAM HLX64623 or PHILIPS 7724)

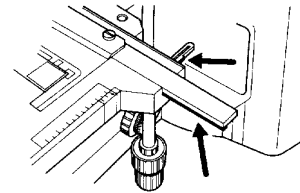
2. Precautions for replacing the lamp

To prevent burns, allow the lamp to cool for at least thirty minutes after turning off the power switch before replacing it. Furthermore, to prevent electrical shock and damage to the microscope, always turn off the power switch (flip it to the "0" side) and unplug the power cord before connecting or disconnecting the lamphouse.

After replacing the lamp, be sure to attach the lamphouse cover securely. Never use the lamphouse without its cover.

3. Precautions for operating the stage

The stage rack protrudes when the stage is moved. When operating the focus knobs or condenser focus knob, be careful not to graze your hand on the end of the rack.



4. Do not wet the microscope

If the microscope gets wet, a short circuit may result that could damage it or make it extremely hot. If you accidentally spill a liquid on the microscope, immediately turn off the power switch (flip it to the "0" side) and unplug the power cord. Then use a dry cloth to wipe away the moisture. If any liquid gets inside the microscope, do not use it; instead, notify your nearest Nikon representative.

5. Weak electromagnetic waves

This microscope emits weak electromagnetic waves. The accuracy of any precision electronic equipment may be adversely affected if positioned too close. If the microscope affects TV or radio reception, move the radio or TV further away from the microscope.

6. Precautions for installation

Be careful not to pinch your hands or fingers when installing the microscope.

This microscope is a precision optical instrument, and using or storing it under unsuitable conditions may damage it or may have an adverse effect on its accuracy. See "Installation location" on p. 24 and always use the microscope in a suitable environment.



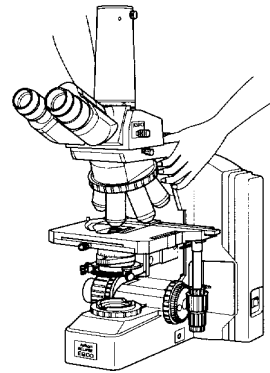
CAUTION

7. Precautions for moving the microscope

First detach the lamphouse, and then securely hold the microscope by the base of the arm from the back.

This microscope is a precision optical instrument, so handle it carefully and do not subject it to a strong physical shock. (The accuracy of the objective in particular may be adversely affected by even a weak physical shock.)

In addition, do not grasp the focus knobs, eyepiece tube, stage, etc. when carrying the microscope. This could cause the part to come off, resulting in damage to the microscope.



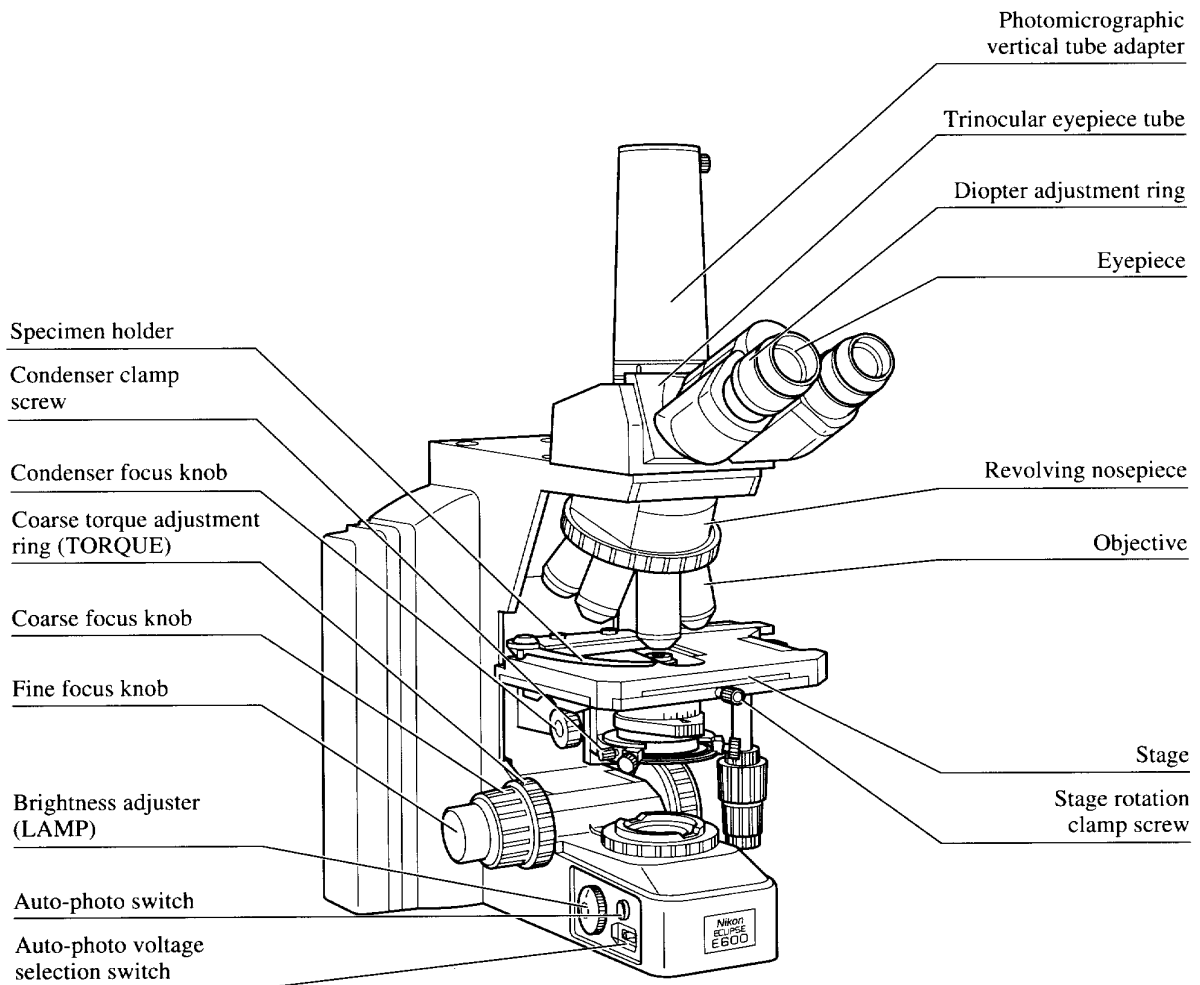
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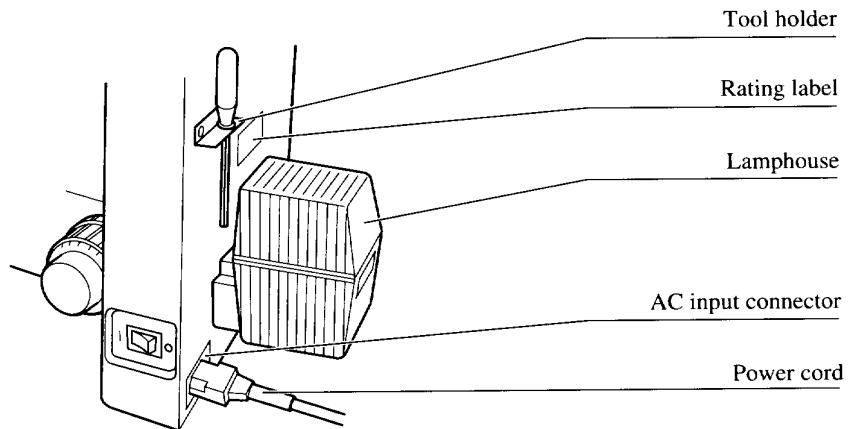
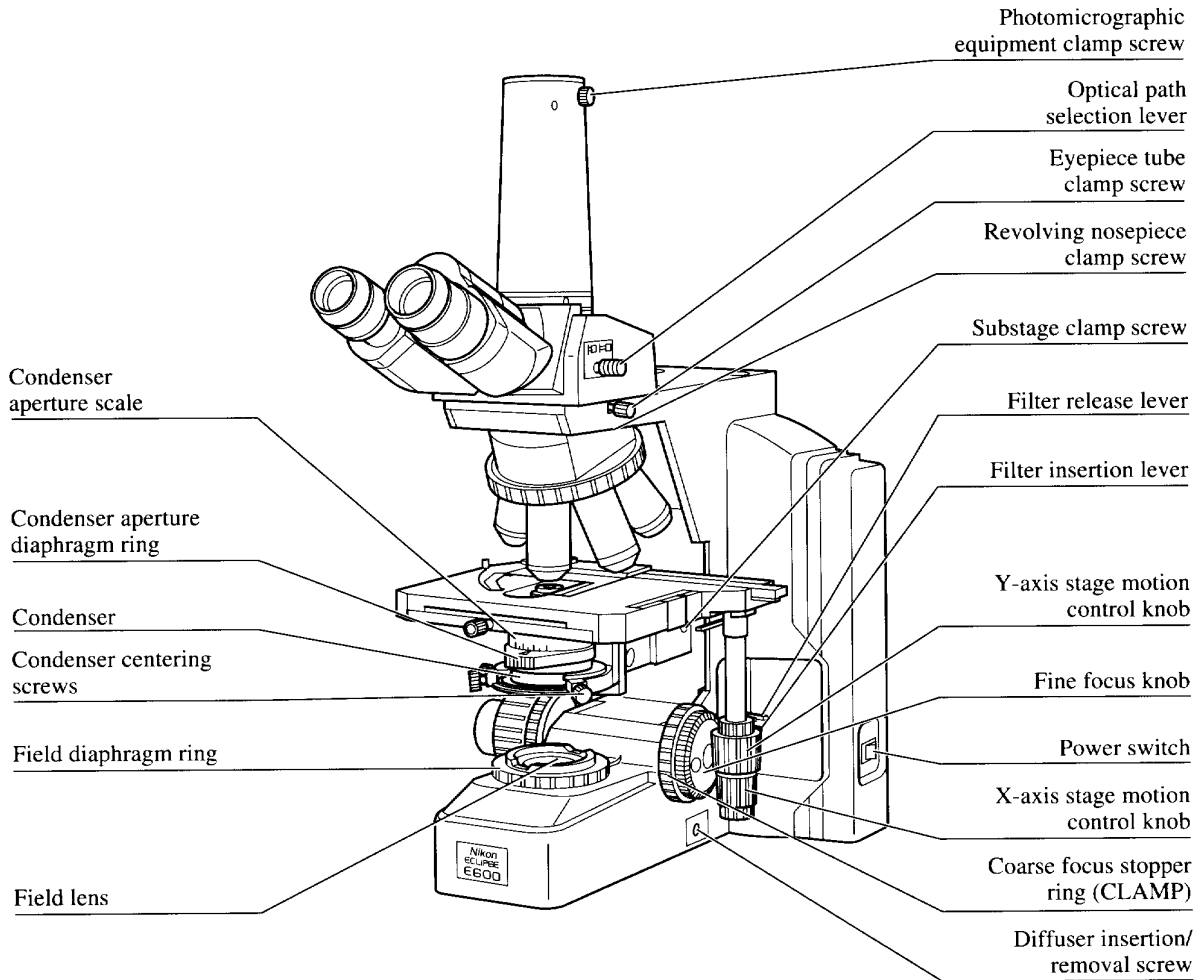
1

Names of Component Parts and Operational Parts

If the microscope has not yet been assembled, see chapter "4. Assembly" first.



1. Names of Component Parts and Operational Parts



2

Microscopy

The general procedure for microscopy is described below.

For details on each step, refer to the corresponding item in chapter "3. Operation of Each Part."

If the microscope has not yet been assembled, see chapter "4. Assembly" first.

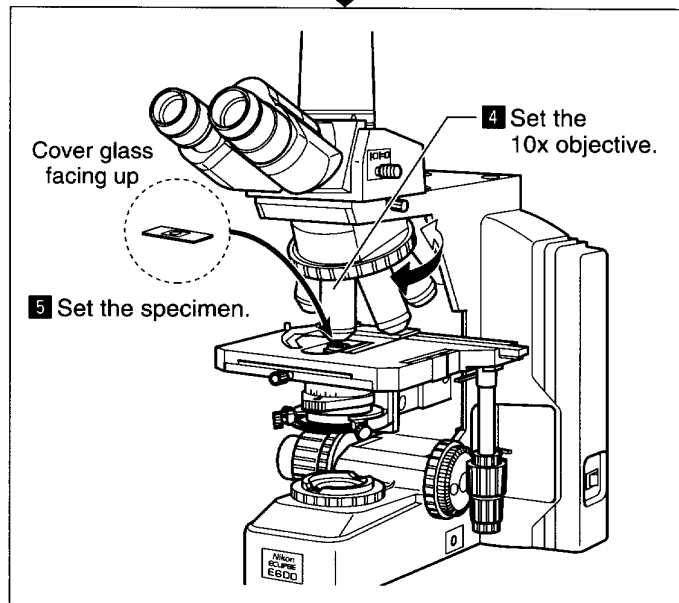
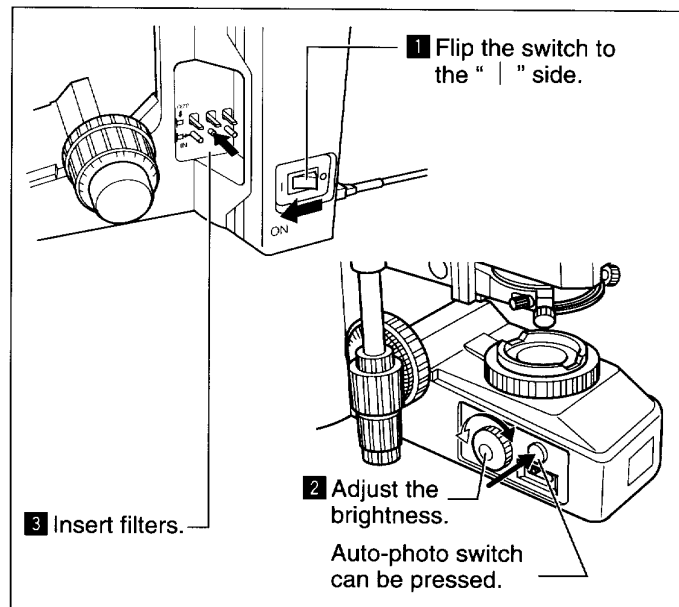
1 Turn on the power.
(Flip the switch to the " | " side.)
As soon as the power comes on, the switch lights.

2 Set the brightness adjuster to give the desired brightness.
Pressing the auto-photo switch will set the voltage for the brightness that provides the best color reproduction. (p. 21)

3 Insert filters ND 16 or 4 and NCB11 into the optical path.
ND16 or 4 reduces glare in the binocular eyepiece.
NCB11 improves color reproduction. (p. 20)

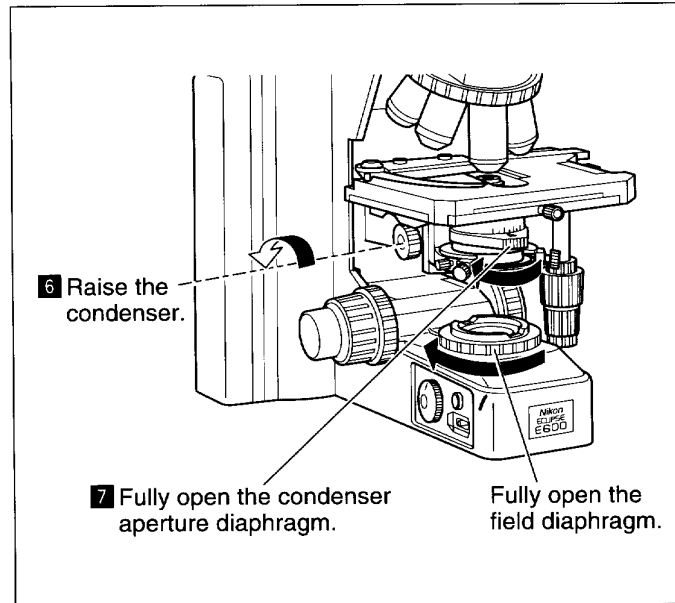
4 Move the 10x objective into the optical path.
Rotate the revolving nosepiece until the 10x objective clicks into place.

5 Set the specimen in place with the cover glass facing up.



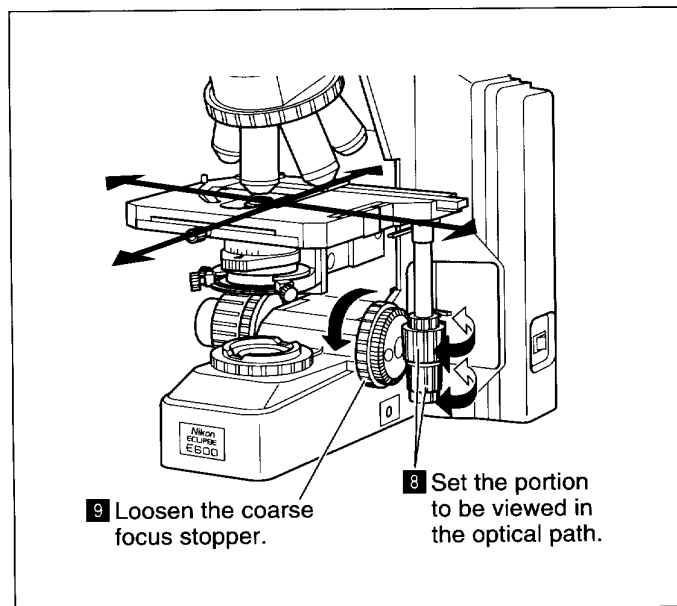
6 Raise the condenser as high as it will go.

7 Fully open the field diaphragm and condenser aperture diaphragm.



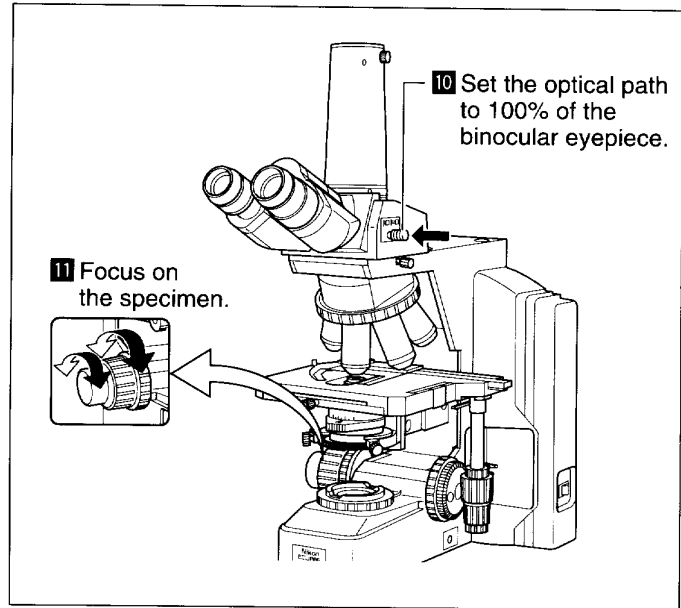
8 Move the specimen until the portion to be viewed is in the optical path. (p. 20)

9 Loosen the coarse focus stopper. Rotate it in the direction opposite the arrow on the base as far as it will go. (p. 14)



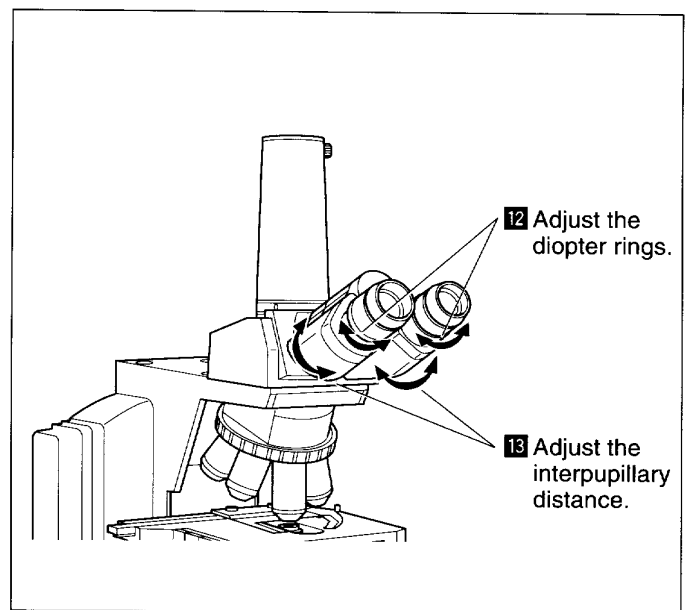
10 Set the optical path to 100% of the binocular eyepiece when using a triocular eyepiece tube. (p. 15)

11 Focus on the specimen. (p. 13)

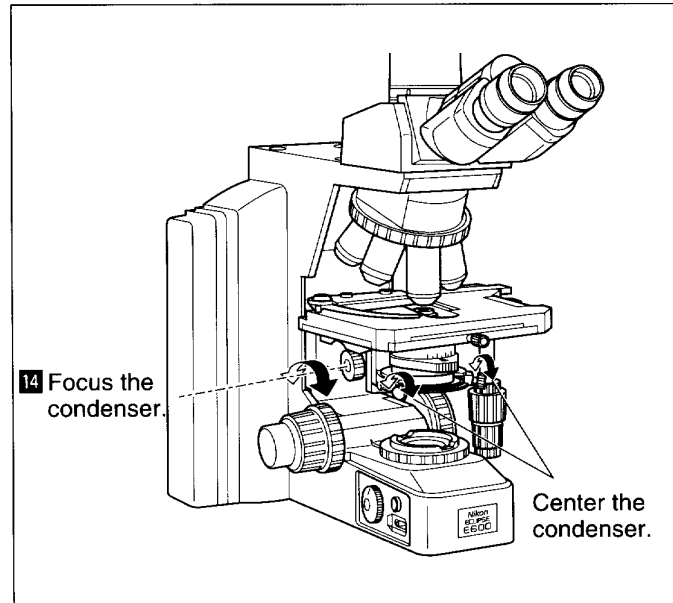


12 Adjust the diopter rings of both eyepieces. (p. 16)

13 Adjust the interpupillary distance. (p. 16)



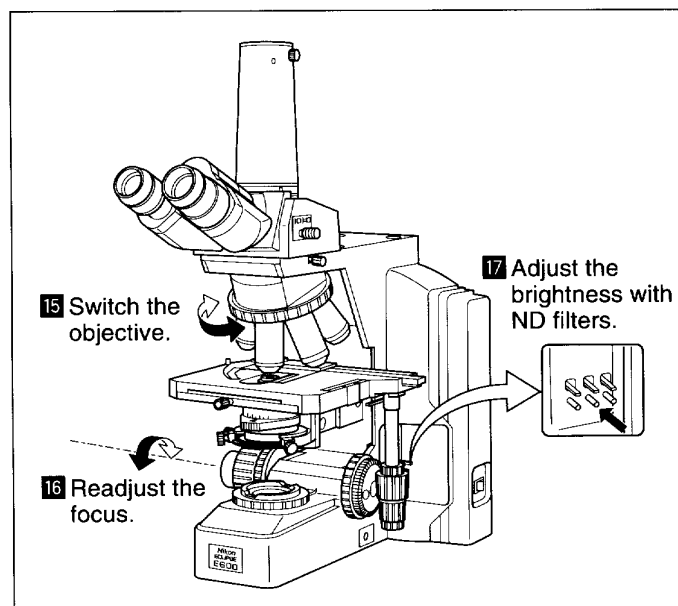
- 14** Focus and center the condenser. (p. 17)



- 15** Switch to any desired objective and view the specimen.
Rotate the revolving nosepiece to its click-stop position.

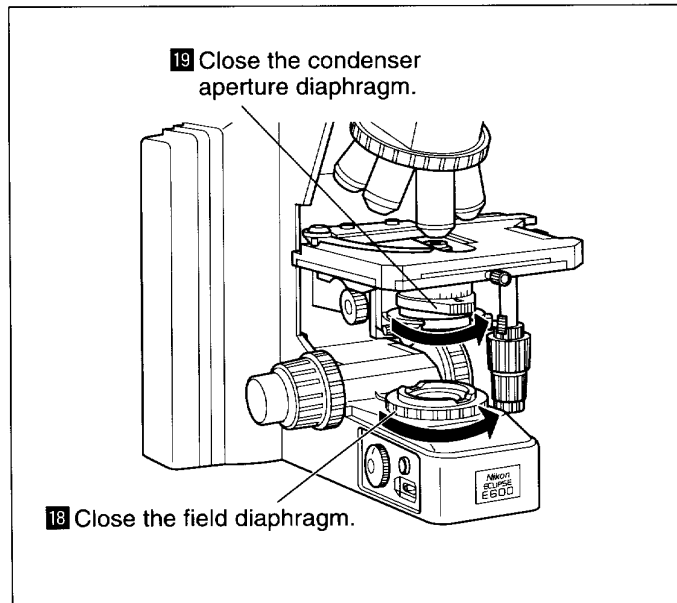
- 16** Readjust the focus.

- 17** Use ND filters to adjust the brightness.



18 Close the field diaphragm so that it is just outside the field of view. (p. 19)

19 Close the condenser aperture diaphragm to about 70 – 80% of the numerical aperture of the objective. (p. 18)

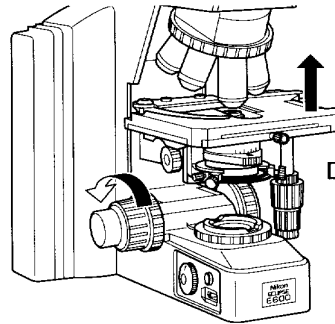


- If a portion of the field of view is dark, adjust the condenser centering screws. If that does not resolve the problem, check the following items:
 - Filter insertion/removal (p. 20)
 - Optical path selection for the eyepiece tube (p. 15)
 - Position of the revolving nosepiece (p. 11)
 - Revolving nosepiece installation (p. 28)
 - Lamp installation (p. 26)
 - Condenser focusing and centering (p. 17)
 - Field and aperture diaphragms (p. 18 and 19)
 - Condenser installation (p. 27)
- If it is not possible to focus on the specimen, check the following items:
 - Mounting of the specimen (p. 31 and 32)
 - Release of the coarse focus stopper (p. 14)
 - Thickness of the cover glass (0.17 mm is standard) (p. 31 and 32)

Operation of Each Part

1 Coarse and fine focus knobs

1. Rotation of the coarse and fine focus knobs and vertical movement of the stage



Direction of coarse/fine focus knobs and stage vertical motion

Rotating the fine focus knob one step moves the stage 1 μm .

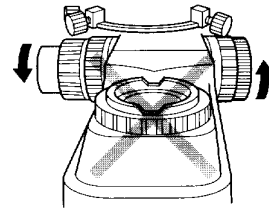
Rotating the fine focus knob one complete turn moves the stage 0.1 mm.

Rotating the coarse focus knob one complete turn moves the stage 12 mm.

The coarse/fine focus stroke (range of vertical motion) for the stage is 2 mm up and 23 mm down from the reference (focused) position.

Never attempt either of the following actions. These actions will damage the microscope.

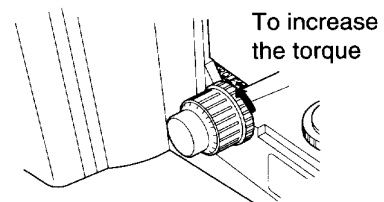
- Rotating the left and right knobs in opposite directions at the same time.
- Continuing to rotate the coarse focus knob after the stage has reached the limit of its motion.



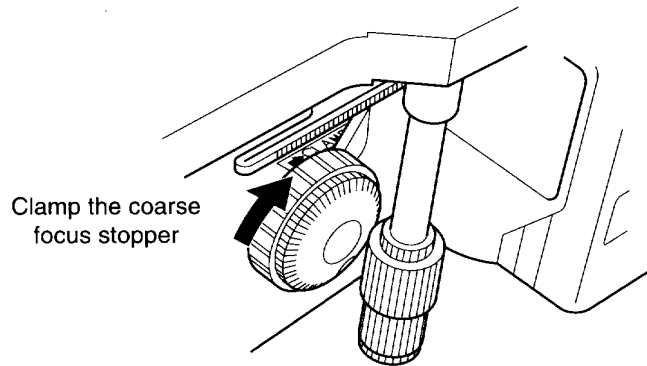
2. Adjusting the torque of the coarse focus knob

It is possible to adjust the torque of the coarse focus knob.

To increase the torque, turn the torque adjustment ring (TORQUE) located behind the coarse focus knob in the direction of the arrow on the microscope base (i.e., the counter-clockwise direction). To reduce the torque, turn the ring in the direction opposite to the arrow (i.e., the clockwise direction).



3. Coarse focus stopper



Purpose of the coarse focus stopper

The coarse focus stopper marks the stage position at which the specimen is in focus by restricting the movement of the coarse focus knob. (Movement of the stage by the fine focus knob is not restricted.)

Once the coarse focus stopper has been clamped in position, the coarse focus knob cannot be used to move the stage any higher. In effect, once the coarse focus knob has been clamped in place at the focus position, a rough focus can be attained the next time simply by turning the coarse focus knob as far as it will go. This feature is convenient when viewing similar specimens one after another.

Using the coarse focus stopper

With the specimen in focus, turn the coarse focus stopper ring as far as it will go in the direction of the arrow on the base of the microscope (about 3/4 revolution). The coarse focus stopper is now clamped in position.

When changing the specimen, lower the stage by turning only the coarse focus knob.

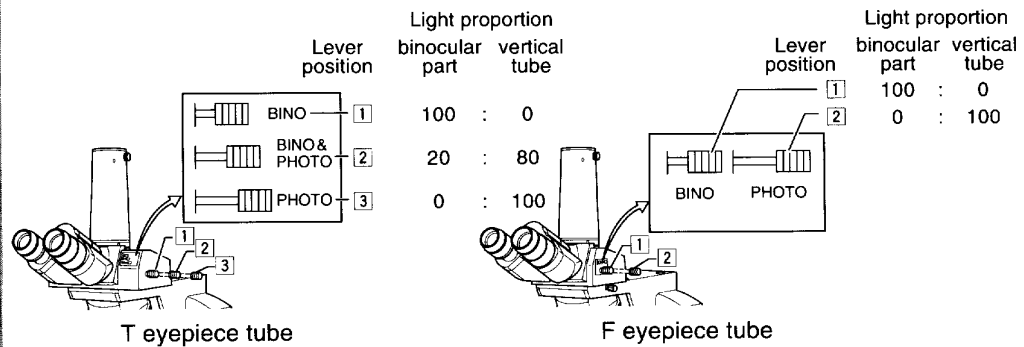
After changing the specimen, gently raise the stage by turning only the coarse focus knob as far as it will go.

The specimen should be roughly in focus when the stage has been raised as far as it will go; use the fine focus knob to bring the specimen into perfect focus.

If the coarse focus stopper is not being used, be sure to turn the coarse focus stopper ring in the direction opposite to the arrow on the microscope base as far as it will go.

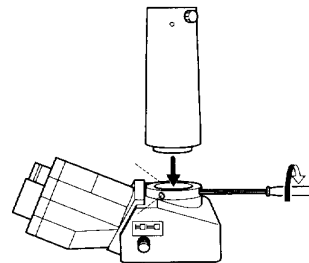
2 Eyepiece tube optical path selection (T eyepiece tube, F eyepiece tube)

The optical path selection lever can be used to select the way to divide the amount of light between the binocular part and the vertical tube.



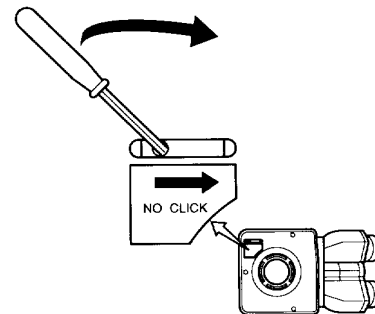
1. Vertical tube adapter

A photomicrographic vertical tube adapter is provided as standard equipment that allows a photomicrographic equipment to be installed. To install the adapter, insert it into the vertical tube and clamp three screws with the provided screwdriver. Replace this adapter with the optional TV vertical tube adapter when using a TV camera.

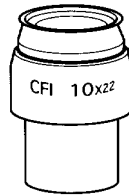


2. T and F eyepiece tubes lever clicking

There is a switch identified by "NO CLICK" on the bottom surface of the eyepiece tube. Turn the switch in the direction of the arrow with the hexagonal screwdriver provided to disengage the clicking action of the optical path selection lever. Disengaging the clicking action minimizes small vibrations produced by operating the lever.

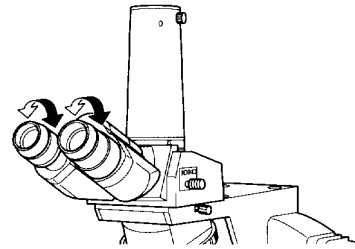


3 Diopter adjustment



Engraved line

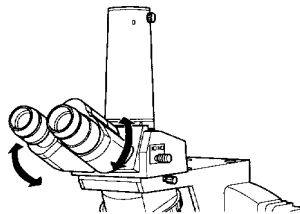
Diopter adjustment "0" position



Diopter adjustment compensates for differences in eyesight between the left and right eyes. In addition to making observation through both eyes easier, this adjustment also reduces the difference in focus when changing the objectives. Adjust the diopter setting for both eyepieces.

- 1 Turn each diopter adjustment ring on both eyepieces to align the edge of the ring with the engraved line. This is the "0" position.
- 2 Perform steps **1** to **11** in chapter "2. Microscopic Procedure" so that the specimen is in focus with the 10× objective.
- 3 Move the 40× objective into the optical path. Turn the coarse and fine focus knobs to focus on the specimen.
- 4 Move the 4× or 10× objective into the optical path.
- 5 **Turn the diopter adjustment ring on each eyepiece**, not the coarse and fine focus knobs, to bring the specimen into focus, while peering through the right eyepiece with your right eye and the left eyepiece with your left eye.
- 6 Repeat steps **3** to **5** twice.

4 Interpupillary distance adjustment



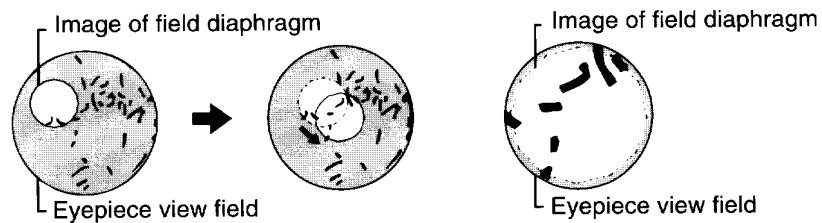
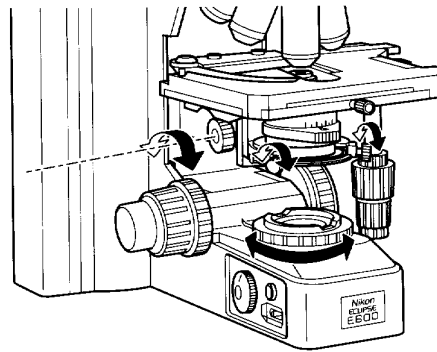
Before adjusting the interpupillary distance, performs steps **1** to **12** in chapter "2. Microscopic Procedure" so that the specimen is in focus with the 10× objective.

Adjust the interpupillary distance so that the view field for each eye is at the same position on the specimen.

Doing so will make observation through the binocular eyepiece with both eyes easier.

5 Condenser

1. Focusing and centering

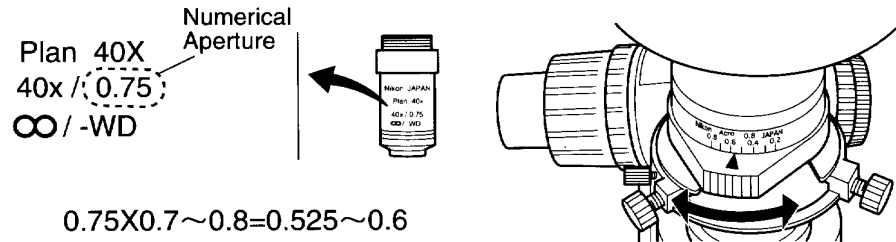


Focus and center the condenser so that the light passing through the condenser forms the image at the correct position on the specimen (i.e., at the center of the optical path).

Before focusing and centering the condenser, perform steps **1** to **13** in chapter "2. Microscopic Procedure" so that the specimen is in focus with the 10× objective.

- 1** Close the field diaphragm to its minimum setting.
- 2** Turn the condenser focus knob so that the image of the field diaphragm is formed on the specimen.
- 3** Make rough adjustments with the condenser centering screws so that the image of the field diaphragm appears at the center of the eyepiece view field.
- 4** Move the 40× objective into the optical path. Turn the fine focus knob to focus on the specimen.
- 5** Turn the condenser focus knob so that the image of the field diaphragm is formed on the specimen.
- 6** Adjust the condenser centering screws so that the image of the field diaphragm appears at the center of the eyepiece view field. This adjustment is easier to make if you adjust the size of the field diaphragm to be slightly smaller than the eyepiece view field.

2. Condenser aperture diaphragm



The aperture diaphragm is important because it is related to the resolution, contrast, depth of focus and brightness of the optical image. Turning the condenser aperture diaphragm ring changes the size of the aperture diaphragm.

As the aperture diaphragm is stopped down, resolution and brightness are reduced while contrast and depth of focus are increased. Conversely, as the aperture diaphragm is opened, resolution and brightness are increased while contrast and depth of focus are reduced. It is not possible to adjust one pair of characteristics without affecting the other. Generally, a satisfactory image with appropriate contrast can be obtained with an aperture setting that is 70% to 80% of the numerical aperture of the objective. The numerical aperture is indicated on the barrel of each objective.

An indication of 40×/0.75 means that the magnification is 40× and the numerical aperture is 0.75.

If the aperture diaphragm is stopped down too far, the resolution is reduced; therefore, except when viewing a nearly transparent specimen, we do not recommend stopping down the aperture to less than 60% of the numerical aperture of the objective.

Adjusting the size of the aperture diaphragm according to the condenser scale

Since the condenser scale indicates the numerical aperture, adjust the aperture diaphragm ring according to the scale. (Normally, the index on the aperture diaphragm ring should be aligned with the scale line corresponding to 70% to 80% of the numerical aperture of the objective.)

Adjusting the size of the aperture diaphragm by using a centering telescope (sold separately)

Remove one of the eyepieces and, by using a special adapter (sold separately), mount a centering telescope in its place. Turn the aperture diaphragm ring to stop down the aperture diaphragm as far as possible. While holding down the flange of the telescope, turn the eyepiece of the centering telescope and focus on the aperture diaphragm.

Turn the aperture diaphragm ring to adjust the size of the aperture diaphragm. (Normally, the aperture diaphragm should be adjusted so that it is about 70% to 80% of the size of the field being viewed.)

Remove the centering telescope and adapter, and then re-fit the eyepiece.

3. Objective and condenser combinations

Condenser Objective magnification	Achromat/ aplanat condenser	Swing-out condenser	Achromat condenser	Abbe condenser	Low- magnification condenser
1×	×	×	×	×	◎ (Note 2)
2×	×	○ (Note 3)	×	×	
4×	×		○ (Note 1)	○ (Note 1)	
10× to 100×	◎	○	○	○	×

◎ : Optimum ○ : Appropriate × : Inappropriate

Note 1: The entire view field may not be satisfactory when a UW eyepiece is used.

Note 2: Indoor lighting and similar light sources may be reflected from the surface of the condenser lens and be visible within the view field. When this happens, either dim the indoor lighting or prevent strong outside light from entering the stage.

Note 3: Swing out the top lens before usage.

- Depending on the type of objective, the whole numerical aperture of the objective may not be covered. For example, when an objective with an N.A. of 1.4 is used, the aperture size of the swing-out condenser or the abbe condenser will only be about 65% of the objective's N.A. even when it is fully opened.
- Refer to the condenser instruction manual for details of universal and phase contrast condensers.

6 Field diaphragm

The field diaphragm restricts illumination to the area on the specimen being viewed. Turning the field diaphragm ring changes the size of the field diaphragm. For normal observation, the size of the diaphragm should be slightly larger than the boundary of the view field. If a broader area than necessary is illuminated, stray light will enter the view field, creating flaring and reducing the contrast of the optical image. The correct setting of the field diaphragm is especially important in photomicrography; generally, good results are obtained by stopping down the field diaphragm to just slightly larger than the area that will be reproduced on the film, i.e., the size of the photo frame.

7 Filters

Three filters are housed in the base of the microscope.

A filter is inserted into the optical path by pressing in the filter insertion lever on the right side of the microscope. The filter is removed from the optical path by pressing the release lever down.

NCB11 (color balancing filter)	For color balance adjustment and color photomicrography
ND16 (transmission rate: 6%)	For brightness adjustment
ND4 (transmission rate: 25%)	For brightness adjustment

A diffuser is contained in the microscope. When removing the diffuser from the optical path, turn the diffuser insertion/removal screw as far as it will go (about 90°) in the counter-clockwise direction with a hexagonal screwdriver. When returning the diffuser to the optical path, turn the screw as far as it will go in the clockwise direction.

8 Stage

1. Adjusting the torque of the stage motion control knobs

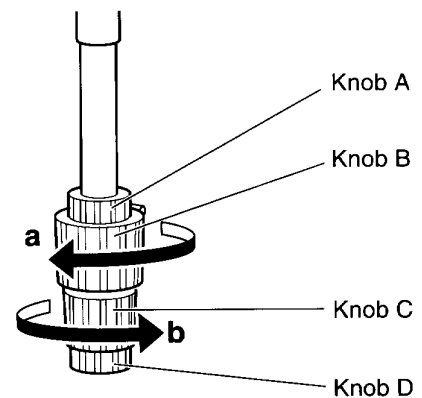
The torque of the X-axis and Y-axis stage motion control knobs can be adjusted.

Adjusting the torque for Y-axis stage motion

To increase the torque of the Y-axis, turn Knob B in the direction of arrow "a" while holding Knob A; to reduce the torque, turn Knob B in the opposite direction.

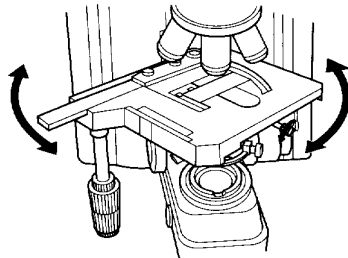
Adjusting the torque for X-axis stage motion

To increase the torque of the X-axis, turn Knob C in the direction of arrow "b" while holding Knob D; to reduce the torque, turn Knob C in the opposite direction.

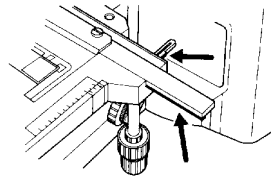


2. Stage rotation

Loosen the stage rotation clamp screw to rotate the stage. Rotating the stage is useful for cropping images during photomicrography.



CAUTION The stage rack protrudes when the stage is moved. When operating the focus knobs or condenser focus knob, be careful not to graze your hand on the end of the rack.

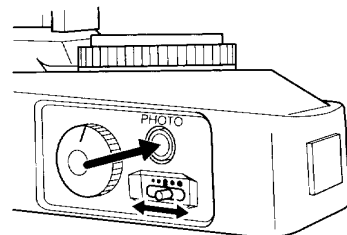


9 Auto-photo switch (for photomicrography)

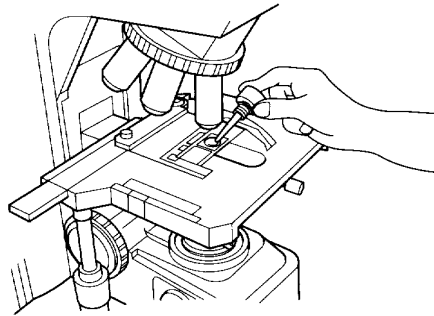
The color temperature of the lamp varies according to the voltage. If the voltage is high, the color temperature of the lamp increases and the light becomes bluer. If the voltage is low, the color temperature of the lamp decreases and the light becomes redder. Therefore, to obtain the best color reproduction in color photomicrography, it is necessary for the lamp voltage to be kept constant. When using daylight-type color film, the standard setup is to use the color balancing filter (NCB11) and set the lamp voltage to 9 V.

The auto-photo switch is used to automatically set the standard lamp voltage (9 V). If the images on color film shot with the auto-photo switch on are reddish or bluish, finely adjust the voltage with the auto-photo voltage selection switch. The center position of the 5-level slide switch is roughly 9 V. Sliding the switch forward increases the bluish tint of the light, while sliding the switch towards the back increases the reddish tint of the light.

Use commercially available color compensation filters (CC filters) if this adjustment does not resolve the problem.



10 Oil-immersion operation (using an oil-immersion type of objective and condenser)



An objective marked "Oil" is an oil-immersion type. These objectives are used with the immersion oil applied between the specimen and the tip of the objective. The immersion oil is provided for the microscope.

To get maximum performance from an oil-immersion type of objective with a numerical aperture of 1.0 or greater, an oil-immersion type of achromat/aplanat condenser must also be used. These condensers are used with oil applied between the specimen and the condenser lens.

Bubbles in the oil will adversely affect the viewing of the image, so be careful to prevent the formation of air bubbles. To check for air bubbles, remove the eyepieces, fully open the field and aperture diaphragms, and look at the exit pupil of the objective within the eyepiece tube. (The exit pupil will appear as a bright circle.) When it is difficult to see if there are any bubbles, mount a centering telescope (sold separately) on the eyepiece sleeve with an adapter (sold separately). Then, while turning the eyepiece on the centering telescope to change the focus, look through the centering telescope for air bubbles. If there are bubbles in the oil, remove them by one of the following methods:

- Turn the revolving nosepiece slightly, moving the oil-immersed objective back and forth once or twice. (In the case of the condenser, gently turn the condenser focus knob to move the condenser up and down slightly.)
- Add more oil.
- Remove the oil and replace it with new oil.

Use as little oil as possible (just enough to fill the space between the tip of the objective and the specimen, or between the tip of the condenser and the specimen). If too much oil is applied, the excess will flow onto the stage and around the condenser.

Any oil remaining on an oil-immersion type of objective or staining on the tip of a dry type of objective has a negative effect on viewing. After using oil, wipe all of it away and make sure that there is no oil on the tips of the other objectives. Also carefully wipe away the oil on the condenser lens after use.

Use petroleum benzine to wipe away immersion oil. Removing the oil and wiping with absolute alcohol (ethyl alcohol or methyl alcohol) will complete cleaning.

If you cannot obtain petroleum benzine, use methyl alcohol. Note that methyl alcohol does not clean as well as petroleum benzine and it will be necessary to repeatedly wipe the surfaces (three or four times is usually sufficient to clean the lenses.)



WARNING When using petroleum benzine or absolute alcohol, always follow the instructions provided by the manufacturer. Keep these flammable liquids away from fire or sparks.

11 Water-immersion operation (using a water-immersion type of objective and condenser)

An objective marked “WI” or “W” is a water-immersion type. These objectives are used with the immersion water (distilled water or physiological saline) applied between the specimen and the tip of the objective. Microscopy is performed in the same manner as that for an oil-immersion type of objective.

Since water evaporates easily, periodically check it during observation. Applying excess water will cause it to flow onto the stage and condenser and ultimately result in corrosion.

After use, wipe any water from the tip of the objective and condenser and complete the clean-up process by wiping with absolute alcohol.

If the water dries and leaves a stain, apply a small amount of neutral detergent and wipe gently. Complete the clean-up process by wiping with absolute alcohol.

4

Assembly



WARNING To prevent electrical shock or fire, turn off the power switch (flip it to the “ ” side) during assembly.



- CAUTION**
- When assembling the microscope, assemble the eyepiece tube first.
 - When moving the microscope, be sure to detach the lamphouse and securely grasp the arm from the back of the microscope with both hands.
 - Do not grasp the coarse and fine focus knobs, eyepiece tube or stage, etc. when carrying the microscope. This could cause the part to come off, resulting in damage to the microscope.
 - Be careful not to pinch your hands or fingers when setting up the microscope.
 - Viewing will be adversely affected if any of the lenses is scratched or has fingerprints on it. Handle the lenses carefully during assembly.
 - This microscope is a precision optical instrument. Handle it carefully and do not subject it to a strong physical shock. (The accuracy of the objectives in particular may be adversely affected by even a weak physical shock.)

Assemble each part in sequence as numbered in the diagram. (For details, refer to pages 25 to 29.)

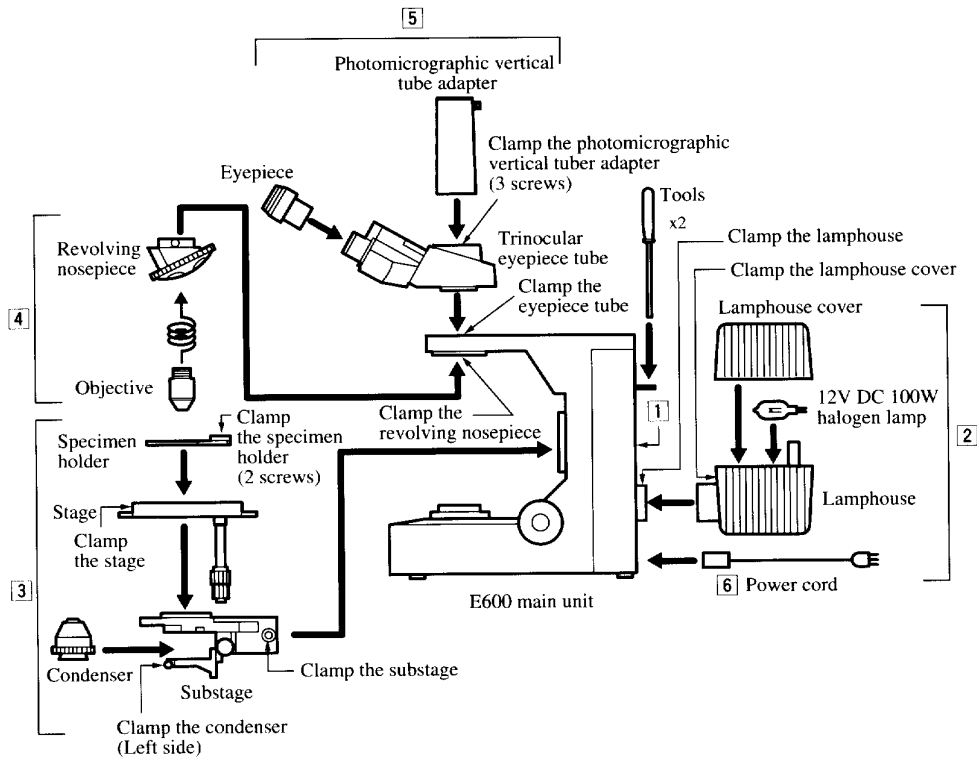
Tools needed

- Two hexagonal screwdrivers (provided)
- When not using, place these in the tool holder in the back of the microscope.

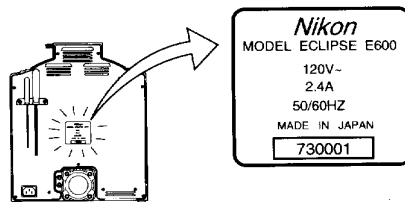
Installation location

This product is a precision optical instrument, and using or storing it under unsuitable conditions may damage it or may have an adverse effect on its accuracy. The following conditions should be kept in mind when selecting the installation location.

- Avoid installing the microscope in a brightly lit location such as a room that receives direct sunlight, or directly under room lights. The quality of the view through the microscope deteriorates if there is excessive ambient light.
- Install the microscope in a location that is free from dust or dirt.
- Install the microscope on a flat surface with little vibration.
- Install the microscope on a sturdy desk or table that is able to bear the weight of the instrument.
- Do not install the microscope in a warm, humid location. In such a location, condensation or mold may form on the lenses, degrading the performance or damaging the instrument.



1. Confirming the input voltage

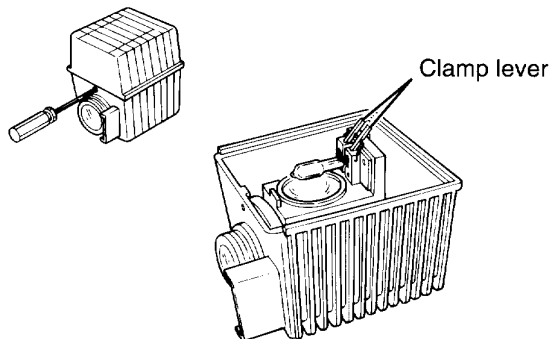


WARNING Make sure that the input voltage indicated on the back panel of the microscope is the same as the voltage provided in your area. If the indicated voltage is different, do not use the microscope and notify your nearest Nikon representative immediately. If the microscope is used with the wrong input voltage, a short circuit, electrical shock or fire may result, causing damage to the microscope.

2. Lamp and lamphouse installation and removal (lamp replacement)



- CAUTION**
- To prevent electrical shock and damage to the microscope, always turn off the power switch (flip it to the “ ” side) and unplug the power cord when connecting or disconnecting the lamphouse.
 - To prevent burns, allow the lamp and lamphouse to cool before replacing it for at least 30 minutes after using.
 - Use the Nikon C-LP HALOGEN 12V-100W model for the lamphouse.
 - Use a 12 V-100 W LONGLIFE halogen lamp (OSRAM HLX 64623 or PHILIPS 7724).
 - Do not touch the glass surface of the lamp with your bare hands. Doing so will cause fingerprints, grease, etc., to burn onto the lamp surface, reducing the illumination provided by the lamp. If you do get any fingerprints or dirt on the lamp, wipe it clean.
 - After replacing the lamp, make sure that the lamphouse cover is attached securely. Never use the lamphouse while its cover is off.



- 1 Check that the power switch is off (i.e., that it is flipped to the “ ” side).
- 2 If the lamphouse is mounted on the microscope, use a hexagonal screwdriver to loosen the lamphouse clamp screw, and then remove the lamphouse from the microscope (the screw is on the top of the lamphouse mount).
- 3 Use a hexagonal screwdriver to loosen the clamp screw on the front of the lamphouse and remove the lamphouse cover.
- 4 While pressing the lamp clamp lever, push the lamp into the socket pin holes as far as it will go. (Do not touch the glass portion of the lamp with your bare hands.)
- 5 Return the clamp lever to its original position. Make sure that the lamp is not tilted.
- 6 Attach the cover securely and tighten the clamp screw. Make sure that the cover is fixed in place and will not come off even when shaken by hand.
- 7 Connect the lamphouse to the microscope by inserting the lamphouse plug into the lamphouse socket.
- 8 Tighten the lamphouse clamp screw to secure the lamphouse in place.

3. Stage assembly

1 Substage installation

Use a hexagonal screwdriver to loosen the clamp screw on the right side of the substage. Fit the substage over the substage mount on the microscope and slide it down as far as it will go. Use a hexagonal screwdriver to tighten the substage clamp screw and secure the substage in place.

2 Stage installation

Loosen the stage rotation clamp screw. Place the stage on top of the substage and fit it in position so that it is level. Tighten the rotation clamp screw with the stage facing to the front.

Note on removing specimen holder

Release two clamp screws of the specimen holder with the stage dismantled from the substage. Securely clamp the screws when reinstalling the specimen holder.

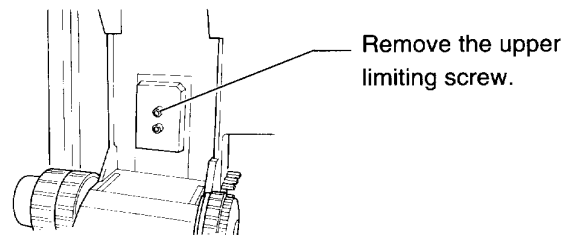
3 Condenser installation

Turn the condenser focus knob to lower the condenser holder as far as it will go. Insert the condenser in the condenser holder. Tighten the clamp screw on the left side with the aperture scale on the condenser facing to the front. Turn the condenser focus knob to raise the condenser as far as it will go.

Observing a relatively thick specimen

Lower the substage according to the following procedure.

- 1 Turn the coarse focus knob to lower the substage as far as it will go and remove the stage.
- 2 Loosen the substage clamp screw with a hexagonal screwdriver and remove the substage.
- 3 Remove the upper limiting screw with a hexagonal screwdriver. (Store the screw in a safe place to prevent its loss.)



- 4 Re-install the substage and stage in their original positions.

4. Revolving nosepiece assembly

1 Revolving nosepiece installation

Use a hexagonal screwdriver to loosen the revolving nosepiece clamp screw. Fit the revolving nosepiece into the revolving nosepiece mount on the microscope from the bottom and slide it toward the rear of the microscope as far as it will go. Tighten the clamp screw to secure the revolving nosepiece.

Note on removing the revolving nosepiece

First, remove all the objectives. Lower the stage completely, and hold the revolving nosepiece in your hand so that it does not fall when you remove it.

2 Objective installation

Lower the stage completely. Screw the objective into the revolving nosepiece so that the magnification increases when the nosepiece is rotated in the clockwise direction when looking down on the nosepiece from above.

Note on removing objectives

If there is a specimen on the stage, remove it first. Lower the stage completely, and hold each objective in both hands so that they do not fall when you remove them.

5. Eyepiece tube assembly

1 Eyepiece tube installation

Loosen the eyepiece tube clamp screw. Tilt and insert the round dovetail on the eyepiece tube into the round dovetail mount on the microscope arm. Then tighten the eyepiece tube clamp screw to secure the eyepiece tube in place.

2 Eyepiece installation

Install the left and right eyepieces, both with the same magnification.

There are positioning protrusions on the right sleeve. Align the notches of an eyepiece with the protrusions on the sleeve and slide the eyepiece on. Some types of eyepiece tube do not have such protrusions.

Fit the rubber eyeguard (sold separately) into the groove around the eyepiece.

6. Connecting the power cord



WARNING Use only the following power supply cord set.

- For 100–120V area
UL Listed, detachable cord set, 3 conductor grounding type SVT, No. 18 AWG rated at 125V, 7A minimum.
In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.
- For 220–240V area
3 pole power supply cord set, which must be approved according to EU/EN standards.
Class I equipment should be connected to PE (protective earth) terminal.
In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.

Make sure to turn off the microscope power switch (flip it to the “ ” side) before connecting the power cord.

Plug the cord into the socket of the AC input connector on the back of the microscope. Securely plug the other end of the cord into an AC outlet.

7. Installing separately sold accessories

Install photomicrographic equipment and other separately sold accessories by referring to the instruction manual for each accessory.

5

Troubleshooting Tables

Improper use of the microscope may adversely affect the performance even if it is not damaged. If any of the problems listed in the table below occur, follow the countermeasures.

Viewing and control systems

Problem	Cause	Countermeasure
Vignetting or uneven brightness in the view field; the entire view field cannot be seen.	The optical path selection lever on the eyepiece tube is in an intermediate position.	Set the optical path selection lever to 100% of the binocular eyepiece. (p. 15)
	The optical path selection lever on the eyepiece tube is not set to 100% of the binocular eyepiece.	
	The diffuser is in an intermediate position.	Insert and remove correctly. (p. 20)
	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece correctly. (p. 28)
	The revolving nosepiece has not been rotated until it has clicked into place. (The objective is not in the optical path.)	Turn the revolving nosepiece until it clicks into place. (Place the objective in the optical path.) (p. 11)
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (p. 17)
	The condenser is not centered.	Center the condenser. (p. 17)
	The condenser is not installed properly.	Install the condenser correctly. (p. 27)
	The filters are not switched fully into position.	Switch the filters correctly. (p. 20)
	The field diaphragm is stopped down too far.	Open the diaphragm to a suitable size. (p. 19)
	An unsuitable objective and condenser combination is being used.	Use a suitable combination. (p. 19)
The lamp is not installed properly.	Install the lamp correctly. (p. 26)	
Dirt or dust in the view field.	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (p. 17)
	The aperture diaphragm is stopped down too far.	Open the diaphragm to a suitable size. (p. 18)
	There is dirt or dust on the lens, condenser, eyepiece, filter or specimen.	Clean the components. (p. 34)

5. Troubleshooting Tables

Problem	Cause	Countermeasure
Viewing is poor (too much or too little contrast, poor resolution).	The aperture diaphragm is stopped down too far.	Open the diaphragm to a suitable size. (p. 18)
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (p. 17)
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
	There is no cover glass.	
	There is no oil on the tip of an oil-immersion type of objective.	Apply Nikon immersion oil. (p. 22)
	The specified immersion oil is not being used.	
	There are bubbles in the immersion oil.	Remove the bubbles. (p. 22)
	There is immersion oil on the tip of a dry type of objective.	Clean the components. (p. 23)
	The compensation ring on an objective fitted with a compensation ring has not been adjusted.	Adjust the compensation ring according to the cover glass.
	There is dirt or dust on the lens, condenser, objective or specimen.	Clean the components. (p. 34)
Uneven focus.	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece correctly. (p. 28)
	The revolving nosepiece has not been rotated until it clicks into place.	Turn the revolving nosepiece until it clicks into place. (p. 11)
	The specimen is not secured in place on the stage.	Install the specimen properly in the specimen holder on the stage.
	The stage has been installed slanted.	Install the stage correctly. (p. 27)
Image flows.	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece correctly. (p. 28)
	The revolving nosepiece has not been rotated until it clicks into place.	Turn the revolving nosepiece until it clicks into place. (p. 11)
	The specimen is not secured in place on the stage.	Install the specimen properly in the specimen holder on the stage.
	The condenser is not centered.	Center the condenser. (p. 17)
	The stage has been installed slanted.	Install the stage correctly. (p. 27)



Problem	Cause	Countermeasure
The image is yellowish.	An NCB11 filter is not being used.	Use the NCB11 filter. (p. 20)
	The lamp voltage is too low.	Push auto-photo switch and then adjust the brightness through the ND filter combination. (p. 20 and 21)
The image is too bright.	The lamp voltage is too high.	
Inadequate illumination (also check the electrical system problems and countermeasures).	The lamp voltage is too low.	Open the diaphragm to a suitable size. (p. 18)
	The aperture diaphragm is stopped down too far.	
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (p. 17)
Focusing is not possible with high-power objectives.	The specimen is placed upside-down.	Set the specimen on the stage with the cover glass facing up.
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
The objective strikes the specimen when changing from a low-power objective to a high-power objective.	The specimen is placed upside-down.	Set the specimen on the stage with the cover glass facing up.
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
	The diopter setting has not been adjusted.	Adjust the diopter setting. (p. 16)
The difference in focus is large when the objective is changed.	The diopter setting has not been adjusted.	Adjust the diopter setting. (p. 16)
The specimen does not move smoothly.	The specimen holder is not fixed securely in place on the stage.	Secure the specimen holder in place. (p. 27)
When viewing through the binocular eyepiece, the image does not resolve into a single image.	The interpupillary distance has not been adjusted.	Adjust the interpupillary distance. (p. 16)
	The diopter setting has not been adjusted.	Adjust the diopter setting. (p. 16)
Eye strain develops while viewing.	The interpupillary distance has not been adjusted.	Adjust the interpupillary distance. (p. 16)
	The diopter setting has not been adjusted.	Adjust the diopter setting. (p. 16)
	The brightness level is not suitable.	Adjust the brightness through the ND filter combination. (p. 20)

2 Electrical system

Problem	Cause	Countermeasure
The lamp does not light when the power switch is turned on.	The power is not being supplied.	Plug the power cord into an outlet. (p. 29)
	The power cord is not connected to the microscope.	Connect the power cord. (p. 29)
	The lamp has not been installed.	Install the lamp. (p. 26)
	The lamp is burned out.	Replace the lamp. (p. 26)
	The specified lamp is not being used.	Use the specified lamp (refer to the electrical specifications on p. 35). (p. 26)
The lamp flickers; the brightness is unstable.	The lamp is near the end of its life.	Replace the lamp. (p. 26)
	The power cord is not connected securely.	Secure the connection. (p. 29)
	The lamp is not plugged into its socket securely.	Insert the lamp securely into its socket. (p. 26)
	The lamphouse is not connected to the microscope securely.	Connect the lamphouse securely. (p. 26)

6

Care and Maintenance

1 Lens cleaning

Do not let dust, fingerprints, etc. get on the lenses. Dirt on the lenses, filters, etc. will adversely affect the view of the image. If any of the lenses gets dirty, clean it as described below.

- Either brush away dust with a soft brush, or gently wipe away with gauze.
- To remove fingerprints or grease, use a piece of soft, clean cotton cloth, lens tissue, or gauze moistened with absolute alcohol (ethyl alcohol or methyl alcohol).
- Use petroleum benzine to clean off immersion oil (p. 23).
- Do not wipe the entrance lens on the eyepiece tube with petroleum benzine.
- Absolute alcohol and petroleum benzine are both highly flammable. Be careful when handling them, when around open flames, or when turning the power switch on and off.
- Follow the instructions provided by the manufacturer when using absolute alcohol and petroleum benzine.

2 Cleaning painted components

Do not use organic solvents such as alcohol, ether or paint thinner on painted components, plastic components or printed components. Doing so could result in discoloration or in peeling of the printed characters. For persistent dirt, dampen a piece of gauze with neutral detergent and wipe lightly.

3 Storage

Store the microscope in a dry place where mold is not likely to form.
Store the objectives and eyepieces in a desiccator or similar container with a drying agent.
Put the vinyl cover over the microscope after use to protect it from dust.
Before putting on the vinyl cover, turn off the microscope power (flip the switch to the “ ” position), and wait until the lamphouse has cooled.

4 Regular inspection

Regular inspection of this microscope is recommended to maintain peak performance. Contact your nearest Nikon representative for details about regular inspection.

Electrical Specifications

■ ECLIPSE E600 (Main body of the microscope)

- Input Power Supply Voltage:**
- AC 100/120V \pm 10% 50/60Hz
Current consumption: 2.4A or less
Internal fuse rating: 125V, 5A
 - AC 230V \pm 10% 50/60Hz
Current consumption: 1.2A or less
Internal fuse rating: 250V, T3.15A

Lamp Rating: 12V DC, 100W halogen lamp
(OSRAM HLX 64623 or PHILIPS 7724)

Protection Class: Class I

- Operating Environmental Conditions:**
- Temperature: 0 to +40°C
 - Humidity: 85% RH max., non-condensing
 - Altitude: 2000 m max.
 - Pollution: Degree 2
 - Installation: Category II
 - Indoor use only

Conforming Standards
• **Product with AC 120V**

- UL Listed product
 - FCC 15B Class A satisfied
- This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protections against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at this own expense.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

• **Product with AC 230V**

- GS approved product
- EU Low Voltage Directive satisfied
- EU EMC Directive satisfied

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